



ENGINEERING DATA

401-2000-LD
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Issue 4

DREXELBROOK ENG. CO. • 205 KEITH VALLEY ROAD • HORSHAM, PA. 19044 • (215) 674-1234

INSTALLATION & OPERATING INSTRUCTIONS 401-2000 COMPACT PROPORTIONAL CONTROLLER

For factory service, call toll free

1-800-527-6297

EDO 3/80/262

401-2000 INSTRUCTION MANUAL

I. INTRODUCTION

A. Purpose and Use

The instructions in this manual pertain to the Drexelbrook 401-2000 series Compact Proportional Controller.

Basically this instrument is a precision electronic current operated controller with three selectable input and output current ranges.

Controller output current is transmitted through standard wiring to the load device. For Example: A valve, I to P transducer, etc. The standard unit will operate from (and supply), any one of the three standard I.S.A. ranges, in any combination.

<u>INPUT</u>	<u>OUTPUT</u>
1-5 milliamperes	1-5 milliamperes into (0-4000 ohms)
4-20 milliamperes	4-20 milliamperes into (0-1000 ohms)
10-50 milliamperes	10-50 milliamperes into (0-200 ohms).

Both high level fail safe (reverse acting) and low level fail safe (direct acting) action are available. The instrument is supplied preadjusted to the output range and fail safe action specified on the purchase order. If no specification is given, it is supplied for 4-20 ma output and with low level fail safe action. However, both options may be field converted.

B. Models Available

- 401-2000-E In Housing
- 401-2000-1 Chassis Only

Standard 401-2000 series instruments meet the following classifications.

<u>Classification</u>	<u>Description</u>
NEMA 1	General Purpose
NEMA 2	Drip Tight
NEMA 3	Weather Resistant
NEMA 4	Water Tight
NEMA 5	Dust Tight
NEMA 12	Oil & Dust Tight
*Explosion Proof	Class 1, Groups C & D Class 2, Groups E, F, & G Div. 1 & 2.

C. Electrical Specifications

The following specifications apply to all 401-2000 series instruments.

- 1) Power Requirement (5 watts)
95-135 VAC. 50/60 HZ
- 2) Line Voltage Effect
Less than + 1/2% over stated line voltage limits.
- 3) Ambient Temperature
-40°F to + 160°F
The units will operate above +160 degrees F, but with reduced component life.
- 4) Temperature Effect
Less than 0.4%/20° F
Referred to input
- 5) Linearity + 1%.
- 6) Input Ranges Switchable
1-5 MA. (250 ohms)
4-20 MA. (60 ohms)
10-50 MA. (25 ohms)
- 7) Output Ranges Switchable
110 Volt Min. Line
1-5 MA (0-4000 ohms)
4-20 MA (0-1000 ohms)
10-50 MA (0-200 ohms)
95 Volt Min. Line
(0-3250 ohms)
(0-750 ohms)
(0-150 ohms)
- 8) Load Resistance Effect
+1.0% over stated range
- 9) Set Point Accuracy
± 1%
- 10) Proportional Band
50% at minimum gain
2% at maximum gain
- 11) Response Time
Less than 6 seconds.
- 12) Fail Safe Action
Switchable either low level fail safe (direct acting) or high level fail safe (reverse acting)

II. INSTALLATION

A. Unpacking

Carefully remove the contents of each carton and check each item against the packing list before destroying any packing materials. If there is any shortage or damage, report it immediately to the factory.

B. Location

The instrument was designed for field mounting but it is desirable that it be mounted in a location as free as possible from vibration, corrosive atmospheres and any possibility of mechanical damage. Ambient temperatures should be between 40 and 160°F. For the convenience at start up it is best to locate the instrument in a reasonably accessible location.

C. Wiring

All connections are made to the barrier strip on the chassis. Due to the low power consumption of the instrument (less than 12 watts) the wiring need only be of a light gauge. Consult the wiring connection diagram 418-2-1-CD for proper connections.

The input is connected to the circuit board on the front of the chassis. Power and output current connections are made to the barrier strip on the back of the chassis. Refer to wiring drawings 401-2000-CD1 and 401-2000-CD2.

III. OPERATION

A. General

This section contains the operating and calibration information for the 401-2000 series proportional controllers. Calibration instructions are divided into three categories:

- 1- Proportional control low level fail safe.
- 2- Proportional control high level fail safe.
- 3- Manual control.

B. Controls

There are three main controls on a 401-2000 series instrument. They are all located on the top of the chassis.

- 1- Set Point
- 2- % P.B. (Proportional Band)
- 3- Manual/Reset

The set point varies from zero to one-hundred percent. This control is a direct indication of the control point (in percent to be maintained).

The proportional band control adjusts from 50% at minimum gain to 2% at maximum gain. A smaller P.B. setting makes the control more sensitive to a change in input.

The manual/reset control is used to reestablish control at the set point after the P.B and set point controls have been adjusted. Also this control can be used for manual control in case of a system failure.

There are three adjustments that are normally set by the factory and need not be changed. They may, however, be reset by field personnel if required.

1. The fail safe selector either high or low level.
2. The input current range selector allows the unit to be changed to either of the other two standard I.S.A. ranges.
3. The output current range selector allows the unit to be changed to either of the other two standard I.S.A. ranges.

C. Start Up

Before applying power to the instrument be sure that the input power will be 115 VAC 50/60 Hz. Check all wiring connections observing polarity of the input and output.

WARNING - Explosion Proof Units

Before the explosion proof case lid is removed to calibrate the unit, the area must be checked and known to be nonhazardous.

When calibration is complete, the cover must be replaced and all bolts tightened.

Each lead from the explosion proof case must be equipped with an approved seal fitting.

D. Calibration

- 1) Proportional control - low level fail safe (direct acting)
 - a. Make sure the system is operating properly and the fail safe link is in the low level position.
 - b. Connect meters to monitor both input and output currents as shown in the start-up drawing.
 - c. Turn the P.B. control completely counter-clockwise to it's minimum sensitivity position.
 - d. Adjust the set-point control to desired setting. For example: If a 80% level is required set the dial for 80.
 - e. Set the manual/reset control to 50.
 - f. Apply power to the system.
 - g. Adjust P.B. control clockwise until the system starts to hunt. Back off P.B. control slightly.
 - h. Adjust the manual/reset control until the desired set-point is reached.

Calibration is now complete.

- 2) Proportional control - high level fail safe (reverse acting).

The procedure for high level fail safe is the same as that for low level, except the fail safe link is fastened in the high level position.

Note that in high level fail safe condition an increase in input produces a decrease in output.

- 3) Manual Control
 - a. Short the input terminals.
 - b. Move the set-point control fully counter-clockwise until it stops.
 - c. Set the P.B. control to minimum (full counter-clockwise).

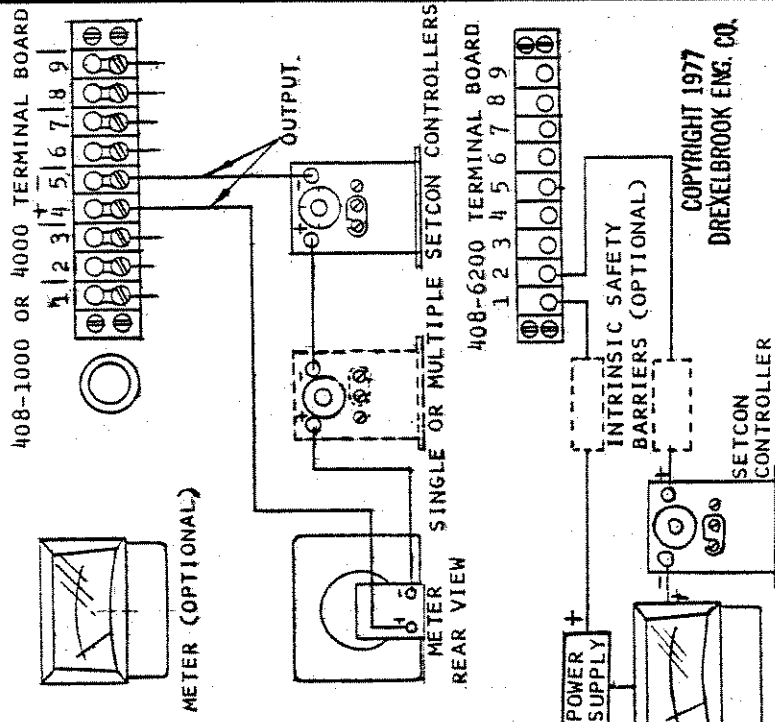
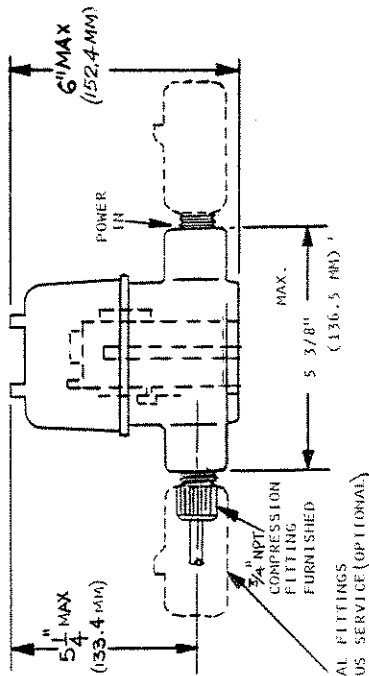
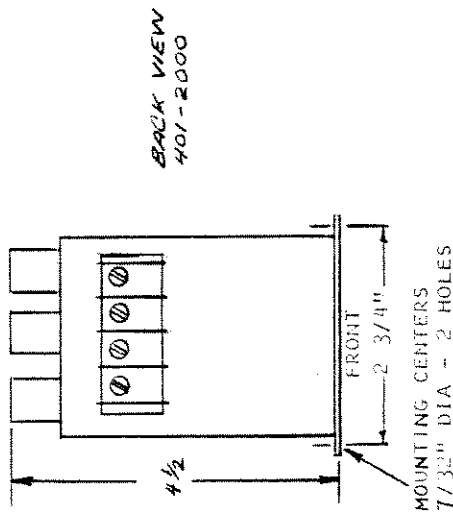
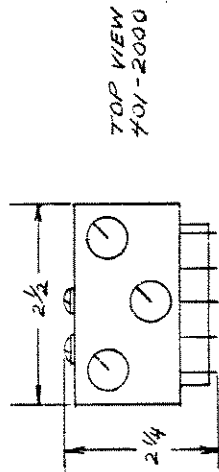
Output current can now be adjusted using the reset control. Percent of current output can be read directly from reset dial.

E. Maintenance

The 401-2000 series instruments are designed to give years of unattended service. No periodic or scheduled maintenance is required.

If the application is critical, a spare chassis should be stocked. If a chassis must be repaired, it should be returned to the factory to be repaired and tested for best performance.

CERTIFIED by _____
 PO# _____
 ENG _____
 USER _____
 DE# _____



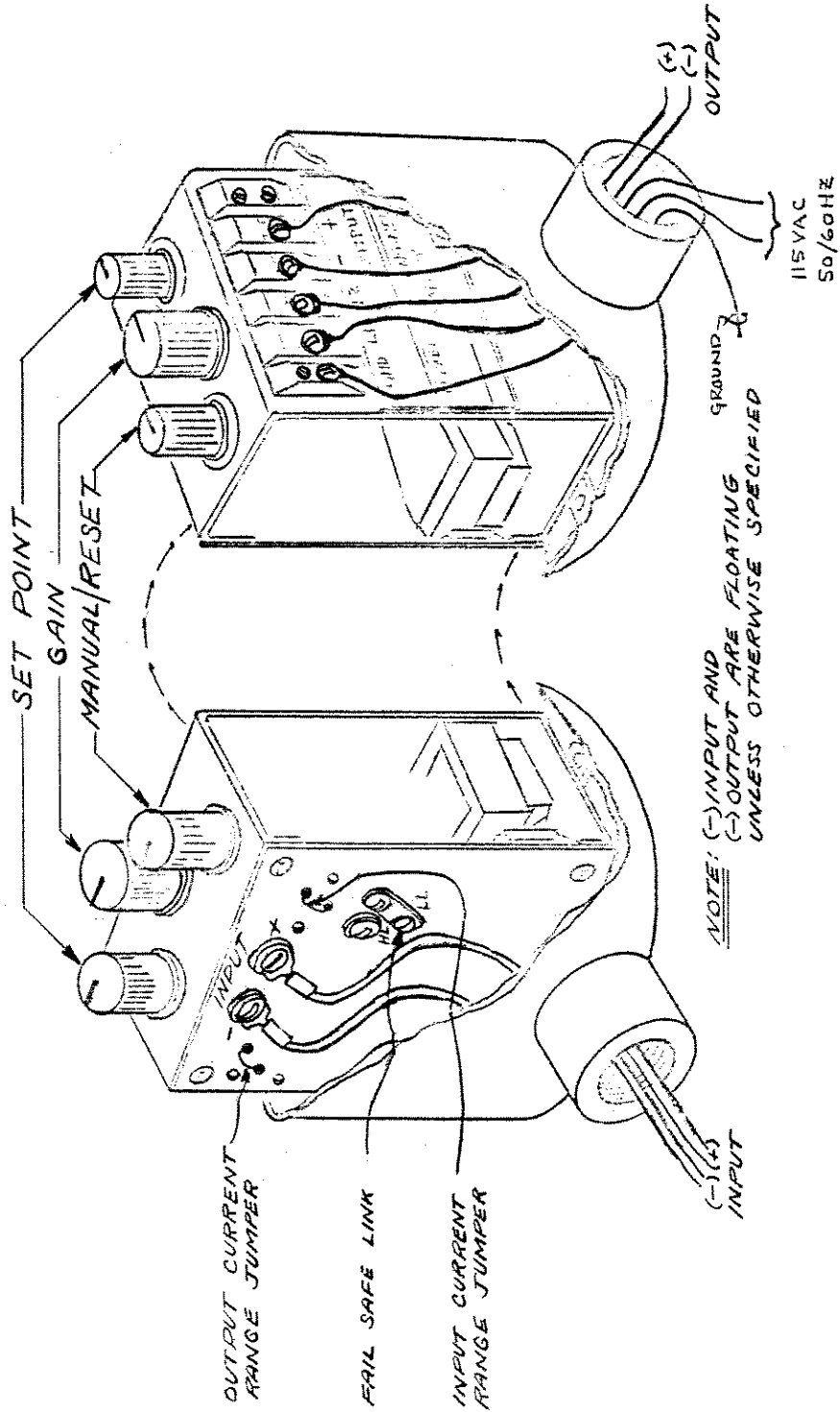
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DR. <i>V. RATNEON</i>		APPD.	C	EDO 2-78-282	11/84	5-17-78
CHK. <i>A. J. J.</i>		PROJ. <i>A. J. J.</i>	B	EDO 6-77-525	<i>J.</i>	1/23/77
SCALE		ENG. <i>A. J. J.</i>	A	EDO 10-77-505		
ISSUE C		NO. 401-2000-CD1	LETTER	CHANGE	REVISIONS	DATE

401-2000 MOUNTING DIAGRAMS

2 EXPLOSION PROOF SEAL FITTINGS REQUIRED FOR HAZARDOUS SERVICE (OPTIONAL)

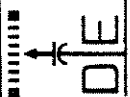
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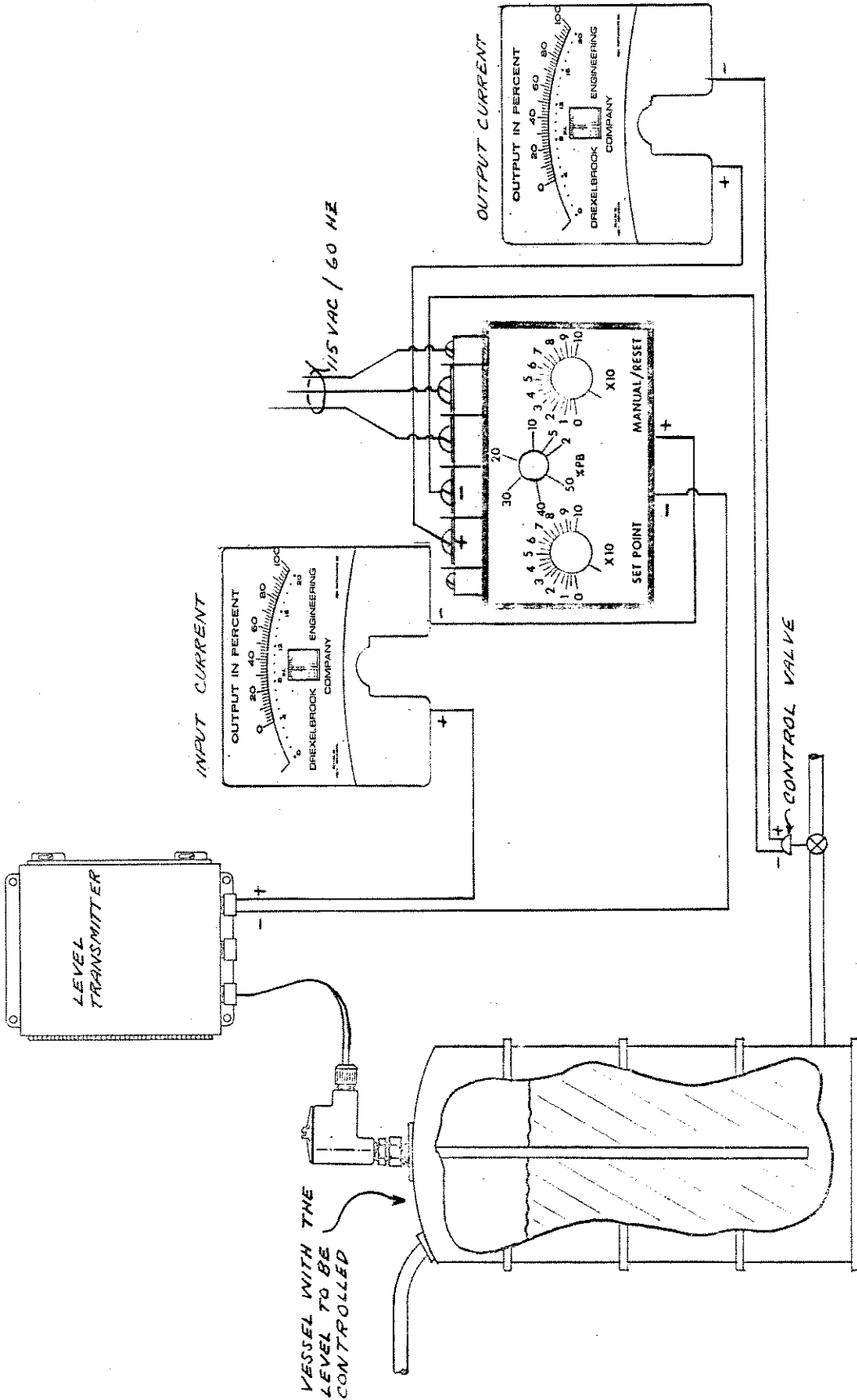


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401-2000 WIRING DIAGRAM

TOLERANCE		DR.	APPD.	B	WSW	12-9-75
FRACTION ±	CHK	PROJ.	ENG.	A	EDD 10-73-505	DATE
DECIMAL ±	SCALE	11-23-73		LETTER	CHANGE	REVISIONS
ANGLE ±	ISSUE	NO. 401-2000-CD2				





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401-2000 START UP
DIAGRAM FOR LEVEL
APPLICATION

DR.	APPR.	PROJ.	ENG.	LETTER	REVISIONS	DATE
				A	CHANGE	
TOLERANCE			NO. 401-2000 - CD3			
FRACTION ±	DR.	APPR.	PROJ.	ENG.	LETTER	REVISIONS
DECIMAL ±					A	EDO 10-73-516
ANGLE ±	CHK.					
ISSUE A	SCALE					



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